Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

SOCIETY OF ARTS.

FRIDAY, JULY 1st, 1853.

ON RECENT IMPROVEMENTS IN THE MANUFACTURE OF SUGAR FROM THE SUGAR CANE AND BEET-ROOT.

BY DR. EDWARD STOLLÉ, OF BERLIN.

As this subject differs essentially in its bearings and scope from a former one, for the treatment of which the Society was pleased to award me the gold Prize Medal last year, I venture to look on myself as justified in entering the ranks of competitors again, and take the liberty herewith of laying before the Society my special researches on the importance of beet-root sugar manufacture as compared with that of colonial sugar; and of appending to these an accurate Report of the further development of my discovery of a new method for producing cane-sugar, which I mentioned and substantiated on scientific grounds in my paper of June 10th, 1850.

Whilst almost every packet from the British West Indies brings melancholy tidings of the state of the sugar manufacture there; and the latest newspapers, in fact, mention that since1848, about 128 estates have *totally* abandoned cultivation, and seventy-eight others have let the half of their cane-fields lie fallow, their European rival is advancing with irresistible and gigantic strides towards complete development, as a mere cursory glance at my Map, exhibiting the extent and progress of the beet-root sugar manufacture, will suffice to convince. This fact alone proves most urgently the necessity of a thorough reform in the antiquated, almost antediluvian process of sugar manufacture in the colonies.

We must bear in mind above all, that the manufacture of sugar from beet-root (which is indigenous to Europe, and is protected and cherished with paternal care, and even sometimes with undue partiality by the various Governments of those States in which it is carried on), enjoys from the very nature of the attendant circumcustances, and will for some time to come continue to enjoy, certain advantages over its competitor: these advantages may be stated under six heads, viz.:

1. The superior intelligence, skill and attention of the operatives employed.
2. The superiority and ingenuity of the machinery used, any necessary repairs of which can be executed without delay or difficulty.
3. The opportunities of association and contact with the men of intellectual progress, with natural philosophers and engineers, who devote a large amount of attention to this subject.
4. The constant presence of the proprietors of the various works, which are, moreover, conducted by able, conscientious, and thoroughly informed managers.
5. The facility which the numerous population of the provinces in which this manufacture is chiefly carried on, offers for obtaining the necessary supply of labour, whether for the cultivation of the raw material, the beet-root, or for the production of the sugar (which is carried on in the winter); and,
6. The more favourable climate; since, in consequence of the lower temperature of Europe offering less danger of fermentation, the risks in the production of sugar are extremely reduced.

Every one who is in any degree acquainted with the state of things in the Colonies, more particularly in the British, will see clearly, that the production of sugar from canes stands at a great disadvantage as compared with the favourable circumstances stated above, attendant on the manufacture of sugar from beet-root; since it is only too well known, that the proprietors of plantations in the West Indies are wont to spend their time and resources at home in the mother-country, and carelessly to leave the management of their sugar-works to individuals for the most part but ill-qualified to discharge the trust; and who, in their aversion to trouble, and being put out of their accustomed routine, throw obstacles in the way of any improvements being introduced, the result of which would only benefit the pocket of their employer. The few exceptions that may be made to this sweeping remark, will not controvert its truth. These two circumstances alone suffice to explain why every improvement in the manufacture of sugar, even when established by unerring experiments, finds so great difficulty in making its way in the Colonies.

It will, perhaps, be answered, that if the zeal and enterprise of the planters have been paralyzed, this is chiefly to be attributed to the costliness of the experience which they have from time to time acquired at the hands of sciolists and soi-disant reformers of the manufacture in question: but even here it is clear, the planters must themselves bear the chief blame, for it is generally the most puffing and extravagant projects that have the best prospect of being adopted by men deficient in sagacity and practical knowledge (as is for the most part the case with the proprietors of plantations), and who are therefore dependent on the goodwill of their subordinates and hirelings for their judgment of the usefulness or undesirableness of any proposals made to them.

On the subject of the present extent of the manufacture of sugar from beet-root in Europe, and its importance as a matter of political economy, every information is afforded by the two maps, which accompany this paper, namely—

1. Map exhibiting the geographical extension of the manufacture of beet-root sugar in Europe.
2. Map exhibiting the geographical extension of the production of sugar in general throughout the world.

The statistical tables and notices attached to them* afford a complete picture of the former manufacturer's future prospects, and capacity for competition, even allowing for the possibility that the governments of the states interested should, within any moderate period, determine to place the taxation of both kinds of sugar on an equal footing.

However interesting it may be to the study of the geography of plants, it is infinitely more so to the profitable working of this root to notice, that throughout the region embraced between the 49th and 53rd degree of north latitude the beet-root thrives equally; that is to say, possesses an equal amount of saccharine matter; whilst southwards from this line it loses in sweetness at a very striking rate. Locality, either eastward or westward, on the contrary, is without influence on the formation of the saccharine element; at any rate, the chemical analyses of beet, which were made under similar circumstances in the Department du Nord and the Government of Kiew (an area of 28° longitude), did not show any difference in the saccharine contents. This circumstance explains how it is that this manufacture develops itself with equal success in the mild climate of Normandy and the rude uplands of White Russia.

In most German manufactories of beet-root sugar, it has been the practice for many years to extract direct from the beet, and without any further manipulation, a product similar to refined sugar, called "Saftmelis" (literally "Juice Sugar"), which becomes at once an article of trade and consumption; a process that in most cases takes fourteen days, but which will very shortly require only half that time; so that in a regular course of manufacture the beet that is taken in hand to-day will give a sugar ready for sale within six, or at latest eight, days hence. Now this sugar can, in the better sort of sugar-houses, be produced for 11⅓ thalers (34*s.*) per cwt., after paying the beet-root duty of 1½ thaler, or 4*s.* 6*d.* per cwt.; whilst a similar sugar from abroad cannot be imported under 18½ to 19 thalers (55*s.* 6*d.* to 57*s.*) per cwt. Supposing then that the present duty on beet-root sugar should be doubled, or what is very unlikely, even trebled, and so amount to 4½ thalers (13*s.* 6*d.*), thus putting it on a perfectly equal footing with the duty on Java sugars and the slave-produced sugars of Brazil, the production of beet-root sugar of a better quality would still not exceed 14⅓ thalers (43*s.*) per cwt., so that plenty of room would still be left for the competition of beet-root sugar.

---

* Portions of the Statistics contained in these Maps have appeared in the Society's Journal.—*See* No. 20, p. 233.

The raw sugar from beet-root (Muscovado) is, of course, produced still more cheaply; the prime cost may be reckoned on the average at 8 thalers (24*s.*) per cwt., including duty. That it is also possible to produce it at less cost is proved by the following statement, drawn up by the manager of a well-known manufactory of beet-root sugar, which in the concluding paragraph demonstrates a prime cost of 6 1/12 thalers (18*s.* 3*d.*) per cwt.

STATEMENT

of the cost price of beet-root sugar in a manufactory working from 25,000 cwt. to 30,000 cwt. of beet in about five months.

	Thalers	£.	*s.*	*d.*
1. 30,000 cwt. beet, at 5 slbg. (6*d.*) per cwt.	5,000	750	0	0
2. Fuel	3,380	507	0	0
3. Wages	1,830	274	10	0
4. Sundry expenses connected with the manufacture, such as press cloths, petty utensils, lighting, repairs of utensils, etc., building, lime, counting-house expenses, etc.	1,160	174	0	0
5. Animal charcoal	515	77	5	0
6. Motive power	300	45	0	0
7. Interest on capital (active and sunk) R. F. 25,000 at 4 per cent.	1,000	150	0	0
8. Fire insurance and various taxes	650	97	10	0
9. Salary of manager	500	75	0	0
10. Wear and tear	700	105	0	0
Thalers	15,035	£2,255	5	0
DEDUCT				
A. For 500 cwt. treacle, which under any circumstances is always worth 15 slbg. (1*s.* 6*d.*) per cwt.	250	37	10	0
B. For refuse from the presses, viz., what remains after feeding the draught cattle employed in the works (the greater part having thus been already turned to account) at 2½ slbg. per cwt.	125	18	15	0
C. For refuse to be used as manure (consisting of impurities precipitated from the juice in defecation) about 130 cart loads, at 15 slbg. (1*s.* 6*d.*) per load	60	9	0	0
Thalers	435	£65	5	0

which leaves 14,600 thalers, or 2,190*l.* as the total cost, including all labour and expenses of working of 30,000 cwt. (1,500 tons) of beet-root, or 7*l.* 6*s.* per 100 cwt. (5 tons).

"In this manufactory at Gotha (the report says further) there were obtained on an average of the years 1840, 1841, 1842, and 1843,—6·33, 6·8, and 7·4 per cent. raw sugar. If we take the mean of these at 6·8 of crystallized sugar (of which 5·1 should be first crystallization), the hundred-weight of raw sugar will cost 7 thalers, 5 slbg. (21*s.* 6*d.*); and where the produce amounts, as it does in many manufactories, to 8 per cent., the cwt. costs only 6 1/12 thalers (18*s.* 3*d.*)"

This statement, which was drawn up ten years ago, assumes, as we have seen, 8 per cent. raw sugar as the highest produce from beet. When we, however, take into consideration that the more skilful manufacturers already obtain 8½ and 9 per cent. raw sugar, and some individuals indeed as much as 10 per cent., it must be conceded that this manufacture has already got a tremendous start over its colonial rival, and will put the latter to its mettle to escape being distanced in the race of competition.

It is true that the cost price of raw sugar, under the present coercive system on the island of Java, seems to come still lower, inasmuch as the pikul (60 kilo) of sugar can be delivered at the port for 5 gulden. Brazilian sugar is also said to be put on board for 1⅔ thalers (5*s.*) per cwt.; and Mr. Sullivan (see Parliamentary Reports of 1850) calculates East Indian sugar to come still cheaper, namely, at 4*s.* per cwt. in London. His calculation is as follows:

Cost of production	7 shillings.
Freight	7 ,,
	14 ,,
Deduct value of rum from the molasses	10 ,,
Amount of the cost price of sugar per cwt.	4 ,,

In striking contrast to these sanguine assumptions, it nevertheless remains incontestible that the cost of production of raw sugar in the West Indies, amounts to a much higher sum—nearly to three and four-fold this amount—and that it is therefore indispensably necessary to strive energetically to reduce it, and eventually improve the process of manufacture.

A more profitable production is to be obtained in two ways:

1st—By producing a more excellent and improved article, the selling price of which shall be incontestibly higher; or,

2ndly—By obtaining a greater quantity of the product of as good a quality as before.

It has been my endeavour to extend my improvements in both these directions, and while my attention was in the first instance directed chiefly to the improvement of the article manufactured, and, without increase of expense, to attain a purer, and consequently more valuable sugar; I have subsequently turned my attention more particularly to obtaining a larger produce, and, as I need hardly say, without detriment to the superiority of the quality.

The success which has crowned the actual introduction into Jamaica of my method of clarification (defecation), and which has paved the way for its extension into almost all the colonies, has doubtless been brought to the knowledge of the Society by its repeated mention in various newspapers. Moreover, this success is the result of the discovery which I have already had the honour of explaining to the Society in the year 1850, and for which it was pleased to award me the gold prize medal. What, however, has most particularly favoured the practical application of my principle, is the fortunate circumstance that I have succeeded in inventing a "finings," which, in addition to the antiseptic properties of my method already alluded to, possesses two other most valuable qualities, as by its application —1st, a *clarifying*, and 2ndly, a *decolouring* action is simultaneously produced. My lately-invented sugar-"finings" has this advantage over the process I formerly communicated, in that the planter can at all times purchase it ready made, can keep it for years without injury to its efficacy, and requires no apparatus of a more or less costly and intricate nature for its application, not to mention the not unimportant circumstance, that this sugar-"finings," notwithstanding its undoubtedly greater efficacy, costs him a third, if not a half less, than if he himself, even under the most advantageous circumstances, prepared for his own use the sulphurous-acid or any sulphite whatever.

My new "finings" is perfectly innocuous to the health, and its application is at the same time so simple, and its results so brilliant, that it has met with the most general and rapid introduction under the name of "*Dr. Stollé's Arcanum*," to such an extent, indeed, that its continually-increasing sale has rendered the establishment of agencies necessary in most of the sugar-producing colonies. The handbill appended gives the name of my agents in Cuba, Porto Rico, Louisiana, Bahia, Pernambuco, and many other places.

The admixture of an almost homœopathic dose of my arcanum with the juice, at the moment of its expression from the cane, suffices to preserve it for a considerable time from fermentation, and render a perfect defecation and decoloration possible in the separating process which follows.

When the arcanum is rightly applied, the defecated juice appears as a clear transparent fluid of a pale yellow colour, it evaporates easily, is less liable than juice treated in the ordinary method is to burning (caramelisation), and produces, if not prevented by carelessness and inattention during boiling, white, sharply-formed crystals, which easily separate from the mother liquor (molasses).

As to the successful working of my newly-invented "finings," when used on a large scale, a letter, from his Excellency Lord Howard de Walden and Seaford, dated March 14th, 1852, affords most conclusive evidence. In addition to this, I take the liberty of adducing a further instance of still more recent date, which shows that my invention has already made its way into other regions than the West Indies. Under date of 5th instant, my general agents, Messrs. H. F. Merck and Co., in Hamburg, write to me as follows: "We have had the pleasure of learning through Messrs. Bieber and Co., in Bahia (our agents), that a trial made there with Dr. Stollé's Arcanum, has produced *the gratifying result of 12½ per cent. increase in the yield of sugar.*"

This improvement, which has been already established, and proved to be such by actual use, appertains more particularly to the *chemical* portion of the manufacture of sugar: I have also succeeded in introducing certain important improvements into the *mechanical* portion of this manufacture, which have been already recognised at their full value by men engaged in this trade.

The improvements I refer to consist in the construction of a small hanging centrifugal machine, peculiarly suited to colonial arrangements for throwing off the molasses: and further, the construction of a machine, preparatory to the use of the centrifugal machine, my so-called mash or kneading apparatus, the object of which is to impart the necessary uniformity to the sugar-paste, which is to be worked in the centrifugal machine, and thus expedite and carry out more thoroughly the process of throwing off the syrup. Both machines have been for two years' past in use in the sugar colonies, and the former of them, more particularly on account of its cheapness and usefulness, is much sought for, and meets with an extensive sale. In corroboration of the above, allow me to refer to a letter from my agents, Messrs. Wittering Brothers, in Amsterdam, dated January 31st, 1853, in which they write me as follows: "Your centrifugal-machine which we sent out has produced *a most advantageous result*, and cannot fail of giving rise to numerous orders; we have also had further demands for Stolle's Arcanum, which we have supplied from our stock."

It may not be superfluous to mention in addition, that in Jamaica alone, a dozen of my machines are working to the satisfaction of their owners, and that they are coming daily more and more into demand in the Brazils, and other sugar-producing countries.

In using the mash or kneading apparatus, the sugar paste is put in at the upper side of the chest (should the paste be too dense, it must be thinned by the addition of some syrup, or even water); the machine is then set in motion, and kept so (from four to five minutes are generally sufficient) till the whole quantity runs off, in the form of an uniform pap, at the lower opening. The crystals will be by no means injured by this operation; but on the contrary, a regular action of the centrifugal machine be secured; since this latter, when it gets pap of an uniform, and not too dense a consistency to cure, works much better, much quicker, and without jerking and jolting.

That which distinguishes my centrifugal machine, before all other similar contrivances, is the circumstance that it can be put up with very trifling expense, and without trouble, almost everywhere, and whilst performing a considerable amount of work, requires very small motive power to keep it going, and thus, in the absence of water, horse, or other motive power, can even be worked by hand with advantage,—a circumstance of peculiar value on small plantations.

Now that I have thus spoken of my inventions and improvements, the applicability and usefulness of which have already been placed beyond the reach of doubt by their actual employment in sugar plantations, there only remains for me to mention those improved mechanical contrivances which I am at present occupied in applying on a large scale, and all of which have for their object the attainment of an increased produce. They have reference to the three following principal stages of the manufacture of sugar, viz.:

1. The extraction of the juice;
2. The filtration of the juice after defecation; *i. e.*, of the solution of sugar from the organic and mineral substances held in suspension; and
3. Evaporation.

For the purpose of obtaining a more convenient and profitable extraction of juice, there have been, as is well known, for many years past, both with reference to beet-root and to sugar-cane, innumerable attempts made, but unfortunately, without exception, ill-contrived ones. The greater part of them failed, from the circumstance that an increased quantity of juice could only be obtained by the application of an unattainable amount of mechanical power, or at a great expense of money.

More powerful presses or mills than those at present in use in the colonies can in fact only be obtained by very considerable outlay, and at increased daily expenses of working; not to mention the evil that the cane, which has passed through their cylinders, is for the most part so crushed and broken up, that it can hardly be used for fuel, by which loss the gain from any increase of juice is reduced to a nullity.

In other cases the attempt has been made to adapt to the sugar cane that process of softening by steeping (called maceration) which has been already here and there applied to beet-root. This system, which has also been called imbibition, lixiviation, digestion, infusion, or *système de déplacement*, is nothing more or less than the application, on a large scale, of the drug presses, so much used by dispensing chemists. The circumstance that threw the greatest difficulty in the way of this system being introduced generally in the colonies, was the apparent necessity of dividing the sugar-cane, as had been the case with the beet, into small portions, or of cutting it up into thin slices, so as to procure for the dissolving action of the macerating fluid free access to the internal texture of the cane. By this proceeding, however, any subsequent use of this sliced sugar-cane as fuel was made a matter of impossibility, and the production became extremely enhanced in price, so that the increased produce of juice hardly sufficed to meet the increased expense of fuel.

I trust I have hit upon the right method to avoid the evils that attend both plans. What I propose is to retain in use the present sugar mill with three horizontal rollers, which, as is well known, with one pressing, extracts only from forty-five to fifty per cent. of the juice. Let now the sugar-cane, which I assume to have been cut into lengths of three feet before being passed between the rollers, be taken and bound loosely together in bundles, and put without delay into the "extruding apparatus." This apparatus consists of six vessels of wood or sheet iron, six feet high at least, and from four to five feet in diameter, connected together by syphon-shaped connecting tubes, closed at the top by a hermetically fitted lid, and at the bottom by an air-tight cover to the man-hole, which is to be used for the purpose of emptying the vessel. At the bottom of each vessel is a worm for the purpose of warming the liquid to the temperature desired. A few feet above these there stands a reservoir of water, which, by hydrostatic pressure, effects the extrusion (*déplacement*) of the juice.

The course of proceeding is as follows:

After the sugar-cane has been crushed in the mill and its interior thereby become accessible to the water it is bound together as before mentioned in loose bundles of about one foot in diameter and three feet in length, and taken to No. 1 vessel of the extruding-apparatus. As soon as this latter is about half-full, warm water (the temperature of which must not exceed 175° Fahrenheit), is gradually admitted to it from the reservoir, and the filling up of the vessel with bundles of pressed cane continued. As soon as the vessel No. 1 is filled up to the top with these bundles, the lid is closed hermetically, and the same process is commenced with No. 2, and carried on till Nos. 3, 4, 5, and so on, are filled and fastened down. The water has in the mean time risen up to the underside of the lid of No. 1, and then runs over through the syphon-shaped connecting tube into No. 2, and from thence to Nos. 3, 4, 5, and so on, becoming at every contact with a fresh bundle of cane more and more impregnated with saccharine matter, till at last in No. 6, it has almost attained the usual density of the ordinary cane-juice, and may now be advantageously sent forward for defecation and boiling. In the meantime the bundles in No. 1 are become thoroughly lixiviated. This vessel is now disconnected from the others, the liquor that is in it is let off into the common reservoir beneath, so as to be used again in case water is not to be had in plenty. Previous to this the cistern above has been put into connection with the vessel No. 2, so as to bring the hydraulic pressure to bear directly upon this latter. The worms before-mentioned as lying at the bottom of the vessels, are used to keep up in them an uniform temperature of 175° Fahrenheit (which, however, must not be exceeded). As soon now as the water has been let off from No. 1, and the bundles of cane have dripped nearly dry, the latter are taken out, dried in the air, and then sold or used as fuel in the usual way. No. 1 is now again filled with fresh bundles of cane, and after being closed down receives the liquor from No. 6, which in the meantime has become weaker. No. 2 is then emptied, and in this way a complete rotation is established.

In this deviation from the usual process of maceration we obviate a very principal objection, which is often put forward with good grounds—namely, we preserve uninjured the fuel that Nature has assigned us, and at the same time obtain nearly twice as much juice: for if, formerly, we were obliged to content ourselves with a produce of 50 per cent. of juice on an average, we may now reckon with certainty on 90 per cent., and of course on a corresponding produce of sugar without the cost of production having been increased in any degree worth mentioning. Any objection on the score of the quantity of water which would be required by this arrangement, I trust to be able subsequently to meet satisfactorily; since there is a well-founded prospect, that by the application of a new idea we shall be able to supply this want everywhere in a manner neither difficult nor expensive.

If I forbear on the present occasion to enter into the details of my second improvement connected with a process of filtration, it is that I am not as yet protected by a patent for the invention; and I can therefore, for the present, only state that I have a method, which is within the reach of every planter, for expediting filtration to such an extent that it may now be introduced on the largest scale. The gain that will accrue to the manufacture of sugar from this improvement will be self-evident to every one who is aware that the bad quality of colonial sugar proceeds mainly from the boiling up into sugar of juice which is unclear, and badly, or not at all, defecated, and consequently very liable to burn.

I have, in conclusion, to draw the attention of the Society to my improved process of evaporating sugar containing juices.

This stage of the manufacture of sugar is notoriously the weak point of colonial industry. The usual arrangements for boiling down the juice of the cane are so defective, and so opposed to all the experiences of science, that it is almost astonishing that anything approaching a decent result should ever have been attained. On the one side, the chief aim seems to be to consume as much fuel as possible; and on the other, it would be difficult to contrive any apparatus more calculated to injure the quality of the sugar.

For the last two years, I have been constantly occupied, in endeavouring to construct an evaporating apparatus more in conformity with the laws of science; to discover the form of an apparatus which should least injure the quality of the sugar, which should produce a saving in fuel, and the purchase of which should, at the same time, be within the pecuniary reach of the smaller planters. This problem I think I have perfectly solved in my invention of the *disc apparatus*. Before I proceed to describe it, I would take the liberty of drawing your attention to a remarkable discovery which I made in the course of my experiments with reference to this apparatus; and I will make no secret to you of the various modifications which my original idea was compelled to undergo before it arrived at the present state of feasibility.

My main object was originally to attain a rapid and violent evaporation by passing steam at a pressure of from 1 to 1½ atmospheres through a horizontal hollow screw, about five feet in length and three feet in diameter, formed of copper or sheet-iron, and kept in constant revolution; the steam being condensed in the last spiral of the screw and issuing therefrom in the shape of water. Whilst experimenting on an apparatus of this construction in my laboratory, I made the gratifying discovery alluded to above—that although the steam that was rushing through my hollow screw had a pressure of from 1 to 1½ atmospheres, the saccharine fluids that were now evaporating away at a great rate, notwithstanding their density (30° Beaumé), never reached a higher temperature than 175° Fahrenheit; so that any caramelisation of the sugar was totally out of the question, the syrup retaining at the same time the pale yellow colour of honey. I subsequently gave up this construction and replaced it with one still more to the purpose.

My new apparatus consists simply of a horizontal shaft, to which a large number of radial rods are screwed. These rods are provided at each end with hooks, to which round discs of coarse calico, linen, ticking, or, under some circumstances, wire gauze, are attached. It is self-evident that in this way, without incurring any great expense, and without loading the shaft too heavily, an enormous evaporating surface is procured, with this additional advantage—that from the simple and efficacious manner in which the evaporating surface is attached, it can be easily and without trouble renewed at any time. The evaporation is further expedited by a fan, or blower, in connection with the driving-shaft, which keeps this evaporating surface in constant motion. This fan forces a constant blast of air through an upright hollow screw which revolves inside the chimney. As the air, thus warmed and dried in the chimney, would be driven into the apparatus through the shaft, made hollow for the purpose, or through pipes laid along the side and provided with air-holes, it would take up moisture, and in this way contribute most powerfully to the drying of the discs (consisting as they do of light material), and materially expedite the evaporation of the fluid imbibed by them at every fresh revolution of the constantly revolving shaft. For the evaporation of the weak juice, two such machines should, according to my idea, be put up, one behind the other, which could be both heated from the same fire; whilst in close contiguity to the fire-place—that is, immediately over the fire, a smaller apparatus might be arranged, which, as being destined for the concentration of the syrup and the complete boiling down of the juice, would be provided with discs of wire-gauze.

There is no doubt that with this simple and anything but costly apparatus, the cleaning of which, moreover, is attended with no difficulty, an extraordinarily rapid evaporation of the juice would be effected without exposing it in the most remote degree to the danger of caramelisation.

In addition, I would remark that from reasons of science I must propose an important alteration in the clarificators, or defecating pans, in use in the colonies. They are for the most part so large (often containing as much as 500 gallons), that it frequently takes one or two hours to fill them. From this cause, a delay most injurious to the quality of the juice, and necessarily of the sugar, arises—a delay that must be obviated by the use of much smaller kettles, containing, say 100 to 150 gallons.

In the crystallization of the sugar, also, the method of proceeding in the colonies is at variance with correct principles. To obtain a beautiful crystal, a sugar of a strong grain, one must use much larger crystallizing vessels. The vessel must be filled as rapidly as possible up to the brim with the fluid sugar, or with the liquor boiled down to the consistency of syrup, and then left undisturbed in a moderately warm place for at least three or four days. As soon as the crystallized mass is nearly cooled, it should be dug out, separated from the molasses by means of the centrifugal machine, and it then offers a beautiful, white, dry sugar, that may be shipped at once without giving rise, let the voyage be ever so long, to those losses which the merchant denominates leakage.

In conclusion, allow me to sum up those improvements in the manufacture of sugar, which I have either already brought into use, or am about to introduce:

They consist in:

1. The extraction of a larger produce of juice from the sugar-cane.
2. A more complete defecation of the juice by the use of the newly invented "Finings," known by the name of "Dr. Stollé's Arcanum."
3. An improved method of filtration.
4. A new process of evaporation.
5. A more complete system of crystallization.
6. An efficacious centrifugal machine, with alternate drums for rapidly separating the crystallized sugar from the mother liquor: and further,
7. My mash, or kneading apparatus, to be used preparatory to the centrifugal machine.

I hope and trust, that the above statement will go a great way towards convincing the Society of Arts, that I have endeavoured according to my powers, to contribute to the improvement of the manufacture of sugar in the Colonies, now so sadly in decay: and that I have indeed already been so fortunate as to pave the way for a great step in advance.

EDWARD STOLLÉ.

NOTICE TO INSTITUTIONS.

General Sir Charles Pasley has forwarded to the Council, for gratuitous distribution to Institutions in Union, 100 copies of his work on Weights, Measures, and Coins. As the number is limited, those Institutions desirous of possessing copies are requested to apply immediately.

LEGAL POSITION OF INSTITUTES.

The following statement has been put forth by the Committee of the Woodbridge Literary and Mechanics' Institution, regarding their non-liability to Parochial Rates:

The Woodbridge Literary and Mechanics' Institution was established in the year 1836, for the following objects, as set forth in the original rules and regulations: the instruction of its members in the principles of the useful and ornamental Arts, by means of Classes, a Library, and the delivery of Lectures on the different branches of Literature, Science, and Art.

At its commencement, the Library and Class rooms of the Institution were in hired apartments, the rates of which were paid by the landlord of the premises. But in the year 1851 a Temperance and Lecture Hall having been built by a company of shareholders, the Committee of the Institution hired of the said shareholders four rooms, attached to the above-named Lecture Hall; for the purposes of a Library and Reading-room, Class-rooms, and as a Depository for Scientific apparatus, at an annual rental of 15*l.*

In April, 1852, a rate of 8*s.* was demanded by the Collector of the Poor Rate; which was *refused*, on the grounds of the non-liability of the premises; according to an act of Parliament passed in the year 1843, viz. 6 and 7 Vict., cap. 36, expressly made and provided for the exemption of societies devoted to the cultivation of "Literature, Science, or the Fine Arts," from Parochial dues, the preamble of which is as follows:

> "Whereas it is expedient that Societies established exclusively for purposes of Science, Literature, or the Fine Arts, should be exempt from the charge of County, Borough, Parochial, and other local Rates in respect of Lands and Buildings occupied by them for the Transaction of their Business, and for carrying into effect their purposes: be it therefore enacted," &c. "That from and after the first day of October, 1843, no Person or Persons shall be assessed or rated, or be liable to pay to any County, Borough, Parochial, or other local Rates or Cesses, in respect of any Land, Houses, or Buildings, or parts of Houses or Buildings, belonging to any Society instituted for Purposes of Science, Literature, or the Fine Arts exclusively, either as Tenant or as Owner, and occupied by it for the Transaction of its Business, and for carrying into effect its Purposes, provided that such Society shall be supported wholly or in part by annual voluntary Contributions, and shall not, and by its Laws may not, make any Dividend, Gift, Division, or Bonus in money, unto, or between, any of its Members, and provided also that such Society shall obtain the Certificate of the Barrister at Law or Lord Advocate, as hereinafter mentioned."

Upon the refusal of the Committee under these provisions of the Act to pay the rate, a summons was issued against the Institution; and on the 21st of April following, the case was heard before the Justices of the Peace in the Town Hall, at Petty Sessions; Mr. James Barritt being defendant in the case. Mr. George Moor, solicitor, attended on behalf of the Institution, claiming exemption rom the said rate, according to the provisions of the said Act of Parliament 6 and 7 Vict., cap. 36, above quoted, and having produced the Act, together with the certificate of John Tidd Pratt, Esq., the Revising Barrister, appointed under its provisions, succeeded in showing that the conditions of the said Act were fully complied with. On the other side, the Magistrates' deputy clerk referred to some recent decisions of the higher Courts, where certain societies had not been allowed the benefit of this Act. The Magistrates, however, did not consider the quoted cases applicable to the one in question; and after having carefully perused the Rules of the Institution, the Act of Parliament referred to, and also the certificate of the Revising Barrister, and having put various questions to the defendant, in relation to the objects and management of the Society, were unanimously of opinion that the rate attempted to be levied could not be sustained, and dismissed the case.

According to the provisions of the Act of Parliament, the parish officers had the power of appeal to the Quarter Sessions, for the Act in the sixth clause clearly stated such to be the legal course of procedure.

CLAUSE VI.

> "Provided also and be it enacted, that any person or persons assessed to any rate from which any society may be exempted by this Act, may appeal from the decision of the said Barrister or Lord Advocate in granting such certificate as aforesaid to the said Court of Quarter Sessions, within four calendar months next after the assessment of such rate, and after such certificate shall have been filed as aforesaid within four calendar months next after the first assessment of such rate, made after exemption shall have been claimed by such society. Such appellant first giving to the Clerk or Secretary of the Society in question twenty-one days previously to the sitting of the said Court notice in writing of his intention to bring such appeal, together with a statement in writing of the grounds thereof, and within four days after such notice, entering into a recognizance before some Justice, with two sufficient sureties to try such appeal at, and abide the order of and pay such costs as shall be awarded by the Recorder or Justices at such Quarter Sessions: and at such Quarter Sessions such Recorder or Justices shall on its being proved that such notice and statement have been given as aforesaid, proceed to hear such appeal according to the grounds set forth in such statement, and not otherwise; and if the certificate of the said Barrister shall appear to him or them to have been granted contrary to the provisions of this Act, shall and may annul the same, and shall and may, according to their discretion, award such costs to the party appealing or appealed against, as he or they shall think proper, and his or their determination concerning the premises shall be conclusive and binding on all the parties to all intents and purposes whatsoever."

No appeal however was made according to the above-quoted provisions of the Act, and the matter was considered as *finally settled*; but on the 21st of April of the present year, some discussion having been raised by an anonymous writer respecting the liability to seizure of a portrait of George Thomas, Esq., the President of the Institution, about to be placed in the Lecture Hall, the question thus seemingly decided and set at rest, was opened in a spirit of controversy, and the defendant in the former case received notice that the subject of the rating of the Institution would be again brought forward, with a view to enforce payment of the rate that had been disallowed by the Magistrates, as well as other rates said to have accumulated from January, 1852. The defendant accordingly attended at the vestry, for the purpose of pleading the decision of the Magistrates, and was fully prepared to enter into the merits of the case, and wishing the parishioners to be thoroughly in formed on the subject, the services of the same legal gentleman were engaged who had conducted the case before the Magistrates. But the senior churchwarden, who was chairman of the vestry, would not suffer the decision of the Magistrates to be pleaded, nor the case to be properly considered, and peremptorily ordered the rate to be enforced.

Having thus been prevented from pleading their cause in the vestry, the Committee of the Institution thought it expedient to lay the whole case before their members; and that the ratepayers also, who were not members of the Institution, might be made acquainted with its merits, they were invited to attend a public meeting, in which the matter might be fully discussed, and the proceedings of the Committee condemned or justified.

A public meeting of the members of the Institution and the rate-payers of the parish was accordingly held in the New Lecture Hall, on the 5th of May, 1853, William Martin, Esq., in the chair. At this meeting, which was numerously attended, a statement was produced in justification of the course taken by the Society in reference to the rate in question; several members of the Committee offered explanations as regarded particular points of the case; the Act of Parliament under which the Society claimed exemption was read, with the certificate of John Tidd Pratt, Esq., the revising Barrister appointed by Government; it was also stated that there were upwards of two hundred similar Institutions at the present time exempt from rates under this Act; and the meeting was unanimously of opinion that it was wrong to endeavour to circumscribe the usefulness of an Institution of so much benefit to the town, by frivolous and vexatious pleas, and passed a resolution *nem. con.*, "That the Committee of the Institution were fully justified in resisting the infliction of the rate."

On the following day, Mr. George Moor, on the part of the Institution, appeared before the Magistrates in Petty Sessions, to show cause why the rates had not been paid; Mr. Moor especially urged the Sixth clause of the Act of Parliament already quoted, on the consideration of the Magistrates. He argued that in this Society the cultivation of Literature, Science, and the Fine Arts, were primary objects; that the Rules contained a law *against* dividends; that there was an absence of dividends between its members; that the Institution was supported entirely by voluntary contributions; that the Barrister's Certificate had been obtained; that all essential conditions to the right of exemption were fully complied with; and that if any person or persons, official or otherwise, were not satisfied with the Barrister's Certificate, they had the power of appeal to the Quarter Sessions within a given time. This they had omitted doing; he therefore considered his client was by this Act justly entitled to exemption.

The Solicitor on the part of the parish then addressed the Magistrates in support of the rate, and stated "That as the several rates had been duly made and allowed, and the defendant had not appealed against them, there remained only to enforce their payment, and for this purpose the Justices of the Petty Sessions were only ministerial and had no discretion or jurisdiction over the merits of the case, and supported his argument by citing the case Birmingham (Churchwardens of) *v.* Shaw, in which case a rule was made absolute under 11 & 12 Vict. c. 44, sec. 5." In this case the Court of Queen's Bench, although of opinion that the rates levied and not appealed against must be paid, decided that the Institution at Birmingham was as to subsequent rates altogether exempt. There is a strong similarity between this case and that of the Woodbridge Institution; the latter, however, being still more within the spirit and meaning of the Act, and the claim of exemption therein contained. Under all the circumstances, the Magistrates said they had no alternative but to issue their distress warrant for five rates, amounting to 2*l.* 18*s.* and 11*s.* 6*d.* court fees, which were subsequently paid.

By the course thus adopted, it will be seen that the Act of Parliament so far from being a benefit to Literary Societies, may be made an instrument for involving them in the intricate meshes of the Law, and imposing on them heavy expenses whenever the parish officers of a town may think proper to oppose its liberal provisions: and when no funds are at hand to meet litigious demands, the holders of a "little brief authority" may destroy such Societies altogether. The appeal to the Quarter Sessions will entail considerable expense; and as the parish officers may carry the case (if decided against them), to the Court of Queen's Bench, at a further cost; the Society having no means in hand to meet such accumulated liabilities, must either comply with an unjust requirement, or appeal to the friends of human improvement to enable them to resist the illegal demands made upon them.

DISTRIBUTION OF HONOURS AT THE LIVERPOOL COLLEGIATE INSTITUTION.

The annual distribution of prizes and certificates took place in the theatre of this institution on Wednesday, the Earl of Harrowby presiding. Surrounding his lordship on the platform were observed his Worship the Mayor, Samuel Holme, Esq.; the Revs. Rector Campbell, Fielding Ould, J. Cordeaux, Dr. M'Neile, Dr. Hume, F. Amos, J. H. Jones, C. Lawrence, A. S. Farrar, and Dr. Jackson, late Principal of the Training College at Battersea; Messrs. Edmund Molyneux, W. Gregson, Edward Cropper, Francis Shand, George Hall Lawrence, Josias Booker, James Tyrer, R. Aked, J. K. Rounthwaite, D. Douglas, T. D. Anderson, J. G. Morris, A. Hodgson, C. Inman, J. Cooper, J. Rawdon, J. Nicholson, E. Jones, &c., &c.

The pupils were assembled in the body of the theatre while the galleries were crowded by ladies.

The noble CHAIRMAN, in opening the proceedings said that he had the honour of being numbered amongst those who contributed to the foundation of that great Institution. He was one of the office-bearers, but the office hitherto with him had been merely an honour, and it was to discharge in some measure the duties attached to that honour that, in compliance with the wishes of the Principal, he was present on that occasion. A few years ago it would have been a physical impossibility for him to have done this; but, in the interval which had elapsed, physical impossibilities had almost disappeared, and nothing but moral ones remained. He might have felt it almost a moral impossibility to have come down, from the occupations of political and social life in London, to this distant part of the country, if it had not been that, for the last few weeks, his thoughts had been specially directed into the very channel in which they would naturally flow in connection with that institution. They had been engaged in London in considering if they could not do something towards giving a better commercial education to the great metropolis. Meetings had been held for the purpose, but they found it rather a difficult thing to put that great inert mass, called the metropolis, in motion. It was a body so vast that it was difficult to throw any spirit into it which should permeate the remoter parts of the system. They had there, if they could, to build upon a foundation of the reign of Queen Elizabeth, well known to men of science as Gresham College. At one time it was the centre of science; the germ, he believed, of the Royal Society; but, like many other old Institutions, it was no longer adapted, in its ancient form, to the wants of the age, and had therefore become a perfect nullity. They wished, then, if they could, to throw a little life into this old dead body. At Liverpool this difficulty was not experienced. Liverpool had no very old foundations; it was a living body throwing out daily fresh emanations of its active organisation; and amongst the most distinguished perhaps—one certainly around which his own feelings had ever centred—was the Collegiate Institution. He looked at it with peculiar interest, as combining an education for every class of society—mixing without confusing, raising without lowering. He had looked at it with peculiar interest also as connected with their own Church; and although he had no feelings of intolerance towards other churches, he might be forgiven if he had a special partiality towards the church of his own belief. Now, it naturally occurred, was not this very Institution doing the work which, in London, they were so desirous of seeing effected—furnishing to the commercial classes of this great community that very education which was so much desired in the metropolis? He believed to a great extent it did; but he believed it might still be enlarged and developed for that purpose, particularly in regard to those physical sciences which prepared men for the concerns of active practical life. He was glad to find that this idea was not a new one here, and he hoped that as, generally speaking, an idea was not long in striking root in Liverpool,—since, unlike so vast a body as London, the people were accustomed to act together for a common purpose—that it would take root and flourish. He was happy to find, by the reports which he had received from various quarters, that the Collegiate Institution was doing an increasingly good work in the matter of educating the various classes of this great community. It shut out none, and encouraged every one; and, in the link which it thus formed between the highest and the lowest, it carried out the great idea of our general constitution, which was order without confusion, together with encouragement to aspiration. It was almost a peculiar advantage of our community that we combined these objects. On the Continent there was generally order, but no encouragement to rise, while in other countries there was rather a confusion of classes; all were encouraged to rise, but there was no very great order. We, on the contrary, combined the two to a very great extent. In our community no one was jealous of those above him, but anxious, at the same time, to be ranked among them—desirous to rise, with a view to better himself, rather than to pull down others to his own level. At the Collegiate Institution they were working precisely in that way, giving to all an education which was advantageous to persons in their several degrees, and giving to all an opportunity of rising to another degree, if their own peculiar genius led them to aspire. He had before him evidence of the root which the Institution had taken in their community. He had before him the prizes which had been earned: and it would be his pleasure to take part in the distribution of prizes so well earned, and for the good of a community so distinguished. This was not a little narrow community living within itself. There was not a lad there who had not an opportunity of placing himself in a position to exercise an influence far beyond the town itself. There was not a lad there who might not go far away to distant lands, and carry with him there the benefits of that education he received here. But he hoped that whether the pupils remained at home or abroad, they would be the missionaries of civilization and religion.

The Principal of the Institution, the Rev. J. S. Howson, then rose, and thanked Lord Harrowby for having come so far at so busy a time to preside on this occasion, and expressed his conviction that by so doing he would confer a great and lasting benefit on the schools. After alluding to some kind inquiries by the Archbishop of Canterbury, at one of the recent educational conferences in London, and expressing the pleasure which all felt in seeing Mr. Farrar, who had won the first M'Neile exhibition, returning in the character of examiner after a distinguished career at Oxford, Mr. Howson called up Bishop to receive the University exhibition. Rawdon was called up along with him, in consequence of having been nearly equal in the examination.

The Earl of Harrowby said it did not become him to say anything while the founder was present, and he called on Dr. M'Neile, who addressed to the boys some words of friendly advice, in the course of which he adverted to the recent honours obtained at the Universities by pupils of this Institution; Farrar having won the prize for a theological essay at Oxford, Rigby being in the first class at Trinity College, Cambridge, Percival being first of his year in classics at Emmanuel College, and Whiteside first in mathematics at Catherine Hall, each of the two latter gentlemen having obtained a scholarship.

Mr. Farrar then spoke with much feeling of the time when he was himself elected to the Exhibition eight years ago, and pronounced a highly favourable judgment on the boys whom he had just examined, stating that some of their papers were quite equal to what would have been produced by young men at Oxford.

Those who had won prizes were then summoned to the platform by the Principal, in successive groups, and the Chairman addressed a few kind and appropriate words to each.

The whole of the prizes having been distributed,

The Mayor proposed a vote of thanks to the noble chairman for his services during the day. For a period of sixteen years the noble lord represented the borough with an ability seldom if ever exceeded, and with an unceasing attention to their interests. He was about to proceed to the Exchange, where he knew a cordial reception awaited him, but he was sure that he would receive as cordial a welcome there, for the manner in which he had delivered the prizes, and the Christian sentiments he had uttered. Indebted to him as they were for coming down to Liverpool at a period when he was engaged in parliamentary business, he was sure they would agree with him "that the best thanks of this meeting be presented to the Earl of Harrowby for his kindness in presiding on this occasion."

The Rev. Rector Campbell seconded the motion, which was carried unanimously.

The Earl of Harrowby, in responding, said:—Ladies and gentlemen, and young friends, I am not unused to be kindly received in Liverpool; and my recollections of those exciting times, I assure you, are unmingled with regret. I made active exertions in what I considered a just cause. On the present occasion I have cause to feel still more gratification. I have only to add a parting word. Recollect you all belong to a great country. It is indeed noble, and a noble part of it is Liverpool, to which you belong. If England were blotted out from the globe, where would be the civilisation of the world? Where would be the means of propagating religion? Blot out from England Liverpool, and where would England be? Where would be her manufactures, her industry, and her energy? Recollect that you have the position of citizens of a great community in a great nation, and consider you are always growing up to fill a noble position; and recollect, therefore, you have a great work to do. And remember, my young friends, that whatever you undertake to do, prosecute it with energy, and you will accomplish it. And now let me bid you farewell; hoping you will continue to prosecute those efforts you have begun so well, that you will continue to make your name known not only in this community, but everywhere; and that you will still endeavour to make the name of the Liverpool Collegiate Institution a name of honour among the great educational establishments of this nation. The noble Lord then sat down amidst considerable applause.

The Rev. Rector Campbell proposed, and Dr. M'Neile seconded, a vote of thanks to the Mayor.

ACCOUNT OF THE QUANTITY OF ENGLISH PRINTED BOOKS EXPORTED ON DRAWBACK, WITH THE RATE AND AMOUNT OF DRAWBACK PAID THEREON, IN EACH OF THE YEARS 1850, 1851, AND 1852.

Years.	Poundsweight of printed booksexported	Rate of Drawback.	Amount of Drawback paid.		
			£	s.	d.
1850	961,536	1½*d.* per lb. and 5 per cent.	6,310	1	7
1851	1,147,138	,,	7,528	1	10½
1852	1,247,843	,,	8,188	19	4½

WEIGHTS AND MEASURES.

Professor Jack, of Fredericton, New Brunswick, has addressed the following remarks to the Editor of the *Athenæum*, in reference to his paper on this subject, which was read before the Society on the 23rd of February, and reported in No. 14 of the Journal:

"I wish to mention," says the writer, "that the paper was of a very unpretending character, and was prepared by me in the spring of 1852 with the intention of being read before a very small association of gentlemen in this place. In the autumn of the same year, I perceived that the Society of Arts had formed a Colonial Committee, one of whose objects, as stated in an inclosure sent through the Colonial Office to the Lieut.-Governor of New Brunswick, is, 'To make a comparison of coins, weights, and measures, as used in the Colonies, and to receive and discuss propositions for giving them uniformity.' Having, therefore, the paper lying by me, I forwarded it, just as it was, thinking that one part of it might furnish some such information as was desired; but not at all supposing that it would be deemed worth reading before a formal meeting of such a body as the Society of Arts. I beg, however, to call your attention to a point which I regard as somewhat important and deserving of further consideration; namely, the way in which I proposed to reduce our confused, perplexing, and incongruous tables of weights to one which would, nevertheless, include all the most essential denominations in each, and moreover be framed in a great measure according to the decimal scale. In Troy weight it is necessary to preserve the *grain*, or some simple multiple or sub-multiple of it. The other denominations are much less frequently used, and can all be readily reduced to grains when needed. In Avoirdupois weight the pound can not be dispensed with; and although the ounce is employed to a considerable extent in the retail trade, yet it is desirable on several accounts to abolish it; and to accomplish this would, I conceive, be neither very difficult nor hazardous. The following is the decimal scale suggested:

Grains.	Millozes.	Centoze.	Secoze.	Oze.	Pound.	Stone.	Sekone.	Hectone.	Kilone.
5 =	10 =	1							
50 =	100 =	10 =	1						
500 =	1000 =	100 =	10 =	1					
7000 =	14000 =	1400 =	140 =	14 =	1				
98000 =	196000 =	19600 =	1960 =	196 =	14 =	1			
980000 =	1960000 =	196000 =	19600 =	1960 =	140 =	10 =	1		
9800000 =	19600000 =	1960000 =	196000 =	19600 =	1400 =	100 =	10 =	1	
98000000 =	196000000 =	19600000 =	1960000 =	196000 =	14000 =	1000 =	100 =	10 =	1

In the table of long measure I have ventured to propose the *foot* instead of the *yard*, as recommended by the Commissioners in their Report of 1841, for the basis from which to proceed decimally,—inasmuch as a decimal multiple and sub-multiple of the former are in common use, more especially among engineers. In this colony the measures of capacity are in a most unsatisfactory state; but a Bill for regulating all weights and measures has been proposed for the consideration of the Provincial Legislature during their present session, and I think it will receive their sanction. My own prepossessions are strongly in favour of adopting the Imperial measures; but I am obliged reluctantly to confess that it would be injudicious to attempt their introduction here, principally for the following reasons:—1. Because the old measures are retained in all the British colonies in North America, and in the West Indies, as also in the neighbouring States of the Union. 2. Because all the liquid measures now in universal use throughout the colony would have to be replaced by the Imperial, at no inconsiderable expense; and many old customs and habits would consequently be interfered with. The needless and mischievous distinction between liquid and dry capacity will be rendered less objectionable by a clause in the Bill which orders that all grains, roots, &c., herebefore sold by stricken or heaped measure shall henceforth be sold by weight, and that so many pounds of such articles, specially named, shall be deemed and taken to be a bushel."

HOME CORRESPONDENCE.

LEGAL POSITION OF INSTITUTES.

Mechanics' Institution, Leeds, June 22, 1853.

Sir,—In the Report of the Meeting on the 9th instant, *item*, "Legal Position," I am reported to have said, "they (*i. e.* Institutions), were very well contented with the Act as it stood; they could take care of their property very well, if they were exempted from rates."

As this sadly misrepresents my words and intention, though perhaps it was unavoidable in the necessary curtailment of my remarks, permit me to say, that desiring to show that the exemption from rates was of much more importance to, and more highly prized by most Institutions than any prospective advantages from the acquisition of a legal position, that I believed if they were polled, they would be disposed to say, we can take care of our property if you will only give us exemption from rates. I did not enforce the importance of pressing for an Act to give a legal standing, with such functions of Corporate Associations as may be requisite for securing the property of Institutions against malversation from within, and pillage from without, although a subject of vital interest to this Institution, because I saw that Mr. Chester, the Chairman, and other gentlemen, representing the Society of Arts, were quite alive to the necessity of procuring a legal recognition for Institutions.

Yours, &c.

W. H. J. Traice.

CHRONOMETERS.

Sir,—I do not think Mr. Loseby will establish the superiority of his compensation balance by publishing fabulous accounts of what took place in the Exhibition of 1851.

Wherever he got it from, there is not a word of truth in his story (and it would be nothing to the purpose if there was), that "the Council Medal which Baron Seguier and Professor Colladon recommended should be awarded for his improvements in horology was not passed [by the Council of Chairmen, of course he means] owing to the opposition of Mr. Denison, who being the Chairman [of the Jury] was the only person in the class entitled to vote [in the Council.]"

So far from my vote, as the sole representative of the Jury, being the obstacle to his success before the Council of Chairmen, his supposed advocate Baron Seguier was allowed to attend that meeting for the express purpose, and by my express consent (the only instance of the kind in all the thirty-four juries), of proposing, in opposition to me, some further council medals besides those which had been regularly sent up by a majority of the jury. One of those proposals he carried, and only lost another by a few votes; and, as Mr. Loseby is rightly informed, he also proposed a council medal for Mr. Frodsham, which was very deservedly negatived by nearly the largest majority which occurred at any meeting of the Council.

Mr. Loseby had been one of eleven exhibitors whose claims to a council medal had been discussed in the jury; but Baron Seguier, I beg to inform him, did not propose him at all to the Council of Chairmen, though I had gone out of the usual course to give him an opportunity of doing so if he thought proper. If he had, I should undoubtedly have opposed it, on the same grounds on which the Astronomer Royal, not once, nor twice, but in three different years, reported against Mr. Loseby's claim to be distinguished by a special reward from all the other inventors of secondary compensations.

All that, moreover, is independent of the much better means which we now have of appreciating the futility of his claim, by that analysis of the Greenwich lists (including two more years of trial than were then published), which he flatters himself he has refuted by that singularly absurd objection, that in the eight coldest and the eight hottest weeks of trial, there occur several weeks of moderate and not extreme temperature.

That is just as absurd as if you were to say, there is no occasion to provide against your water-pipes freezing in the two coldest months of the year, because the average temperature of those months is above freezing point. Mr. Loseby knows perfectly well that on every day of extreme temperature in those eight coldest or hottest weeks, the secondary compensations have to do their work—or betray their defects, although the next day, or the next week, may be all of moderate temperature, which requires no secondary compensation at all.

However, as he complains of my assigning to the two extreme temperatures some weeks which ought to be placed in the mean temperature period, let him try a mean temperature period equal to both the extremes together, by taking twelve weeks for it instead of eight, and thereby increase the intensity of each of the extreme periods; and he will then have the satisfaction of finding that such a division exhibits his chronometers as still more decidedly beaten by Mr. Dent's, than the former division into equal periods, which he objected to.

I shall now take leave of Mr. Loseby, with the advice, whenever he brings forward his next invention, to be a little more sure of his ground before he pronounces that "nothing has succeeded in establishing a claim to the title of being an improvement since the last century," except what he has himself produced.

I remain, yours faithfully,
E. B. Denison.

LOCKS.

Sir,—I observe in last week's Journal a letter from Mr. Hobbs, on the subject of Mr. Saxby's lock, recently rewarded by the Society, which I think needs a few words of explanation and reply, as your acute correspondent appears to be somewhat in error as to the circumstances of the case.

The remarks of Mr. Hobbs appear to amount to this; first, that Saxby's lock is not new, the principle being the same as the Yale lock, and as Cotterill's lock; secondly, that it is not very secure, because he picked it.

Now, unquestionably, Saxby's lock is constructed on the same general principle as Cotterill's and Yale's, and both of them in turn are derived from the Bramah: but this does not prove the locks to be the same; and if Saxby, by ever so slight a modification, produced a lock for half a crown as good as Cotterill's lock for ten shillings, then Saxby certainly deserved the Society's prize.

In seeking for a "cheap and very secure lock," it is evident that the Society desired a good common lock—one which could be made and sold for a few shillings, and yet be much more secure than the locks commonly to be had for such a price, which in fact are too often no locks at all, being easily opened and locked again with a bit of wire or a bent nail.

The term "great security," as set forth in the prize list, meant, I imagine, great security against the attempts of the idle and the mischievous; but it certainly never aspired to defy the systematic ingenuity of a professional lock-picker like Mr. Hobbs. The great security of the store-room or apple-loft is not to be compared with that of the banker's safe or deed-box; and a lock intended for the former, and perfectly secure against all trials to which it might be put, would no doubt be set aside as valueless for the latter.

I think that no one expected, as the result of the Society's premium, an unpickable banker's safe lock for five shillings.

Whether Mr. Saxby's lock is quite new in principle, or whether it is in fact merely a modification of some older lock, is not the question; neither is it important to inquire in how many minutes Mr. Hobbs picked the lock. The real point is, that Saxby's lock is much more secure than *common* locks are, and that it costs much less than really good locks commonly do.

I am, Sir, yours faithfully,
P. L. O.

TO CORRESPONDENTS.

Notice.—Members, and others, who can furnish or obtain original information or suggestions on the subjects included in the Society's Premium-list, or other topics connected with the Society's various departments of operation, are invited to communicate the same to the Secretary, in as condensed a form as possible, for the purpose of being either read and discussed at the evening meetings, or inserted in the Society's weekly Journal. Anonymous letters cannot be attended to. All communications, whether the author's name is to appear or not, must be accompanied by the writer's name and address.

Members of the Society who do not receive the JOURNAL regularly, are requested to give immediate notice to the Secretary; and, in order to prevent mistakes, they are particularly requested to signify any change which they desire to have made in their address, with as little delay as possible.

Country Institutions.—Correspondents who are so good as to send reports of proceedings of Local Institutions, are requested to forward them immediately after the Meeting to which they refer, and not later than Tuesday morning, if intended for insertion in the following Friday's Journal.

MISCELLANEA.

SEWING BY MACHINERY.—A machine, of American invention, has been introduced into this country by Mr. Darling, of Glasgow (at whose manufactory numerous examples of it are now in operation), which carries the mechanical principle into a fresh department of human labour—namely, that of common hand-sewing. The machine is extremely simple in construction. Its framework is of cast-metal, and it occupies little more space than two cubic feet. The right hand of the worker turns a small wheel, which puts in operation two needles,—one an upright needle, the other a sort of semicircular one; and on a strong tabular surface, at the left-hand extremity of which these two needles work—the upright above and the circular under—the cloth is laid with the left hand, and propelled between the needles as the machine proceeds with its stitching. It is said that the machinery is not liable to become deranged, and that any breakage of the thread can be rectified with very little loss of time. The machine can be driven by the foot, after the manner of a turning-lathe, and in this way the rate of work by hand, which is 500 stitches per minute, would be doubled.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. No. *Delivered on 23rd June,* 1853.

583. Tobacco, &c.—Returns.
584. Coals, Cinders, and Culm—Account.
599. Maynooth College—Return.
628. Bills—Seamen's Savings Bank.
636. ,, —Customs Duties on Spirits (as amended in Committee, and on re-commitment.)
638. ,, Dublin Parliamentary Registration.

Delivered on 24th June.

588. Durham Election—Report from Committee.
619. Turnpike Trusts—Return.
648. Sattarah (Receipts and Charges)—Return.
568. River Tyne Return—(a corrected copy.)
639. Bill—Public Libraries (Ireland).

Delivered on 25th and 27th June.

605. Isle of Man—Copy of Letter.
620. Government Stocks—Return.
656. Succession Duty Bill—Copy of Mr. Finlaison's Letter.
603. Police—First Report from Committee.
110. Civil Service Superannuations—Return.
501 (1). Isle of Man (Moneys voted by Parliament)—Return.
541. Metropolitan Commission of Sewers—Return.
576. Ecclesiastical Commission—Return.
622. Westminster Bridge Bill—Minutes of Evidence.
618. Unstamped Publications—Return.
589. Peterborough Election—Minutes of Evidence.
642. Bills—Episcopal and Capitular Estates.
654. ,, —Newspaper Stamp Duties.
655. ,, —Edinburgh and Canongate Annuity-tax Abolition.
644. ,, —Stamp Duties.
Cape of Good Hope (Orange River Territory)—Further Correspondence.
Prevalence of Disease at Croydon—Reports by Dr. Arnott and T. Page, Esq.

Delivered on 28th June.

545. Madras Railway Company—Correspondence.
662. Isle of Man Customs Duties—Copy of Treasury, &c.
Charitable Donations and Bequests (Ireland)—Eighth Annual Report of the Commissioners.
Poor-Laws (Ireland)—Sixth Annual Report of the Commissioners.
Arterial Drainage in Ireland—Report and Appendices.

Delivered on 29th June.

596. Durham Election—Minutes of Evidence.
665. Bills—Brecon Collegiate Church (as amended by the Select Committee.)
651 ,, —Parish Constables (ditto, ditto.)

PATENT LAW AMENDMENT ACT, 1852.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

From Gazette, 24th June, 1853.

Dated 2nd April, 1853.

786. Sir J. C. Anderson—Locomotive engines.

Dated 18th April.

934. H. W. Allen—"Vestal furnace," for carbonization of peat, &c.

Dated 28th May.

1321. E. D. De Boussois—Preventing incrustation of steam-boilers.

Dated 30th May.

1325. J. Brown—Elastic spring-beds, mattrasses, cushions, &c

Dated 6th June.

1390. F. Lott—Cartridges.
1392. D. Barker—Manufacture of blinds, shades, &c., from glass, &c., and also raising, lowering, folding, &c., such blinds, &c.

Dated 9th June.

1405. G. Bott—Method of preventing collisions on railways.
1406. H. B. Barlow—Machinery for spinning, doubling, and twisting cotton, &c. (A communication.)
1407. G. W. Garrood—Propelling vessels.
1409. C. Arnoux—New system of towing and traction.
1410. W. Muir—Improvements in turning-lathes, partly applicable to other purposes.
1411. J. Smith—Machinery for preparing and spinning wool, hair, silk, flax, &c.
1412. J. Smith—Combing wool, &c.
1413. E. Maniere—Manufacture of paper.
1414. W. Brookes—Treating fabrics suitable for floor-cloths, covers, &c. (A communication.)
1415. W. Brooks—Manufacture of boxes and other hollow receptacles.
1416. J. R. Napier and W. J. M. Rankine—Engines for developing mechanical power by action of heat on air, &c.

Dated 10th June.

1417. A. Chasneau—New method of obtaining steam power.
1419. J. Moore—Improvements in respirators.
1420. S. Frankham—Construction of coupling-joint applicable to pipes, vessels, &c.
1421. A. V. Newton—Spinning-machinery. (A communication.)
1422. R. A. Brooman—Manufacture of paper.
1423. J. Westwood and R. Baillie—Construction of iron ships.

Dated 11th June.

1424. C. Nickels—Manufacture of carpets and other piled fabrics.
1425. C. Binks—Improvements in dryers and in preparing drying oils for paints, varnishes, &c.

Dated 13th June.

1426. H. O'Connor—Digging by horse power.
1427. W. H. Smith—Permanent way of railways.
1428. W. Smith—Mode of manufacturing metallic handles for knives, forks, backs for razors, bows of scissors, &c.
1429. J. and T., and J. and W. Marsh—Fastening handles of table-knives and forks.
1430. J. Spencer—Improved cupels.
1431. T. J. Perry—Raising and lowering Venetian and other blinds and other bodies.
1433. W. D. Paine and G. A. Paine—Construction of steam-boilers and steam-boiler furnaces.
1435. R. Hopkins—Machinery for cutting and shaping cork, wood, &c.
1436. J. Webb—Obtaining motive power.

Dated 14th June.

1437. W. G. Craig—Axle-boxes, guides, and bearings of locomotive engines and carriages, partly applicable to bushes and bearings of machinery.
1438. R. W. Sievier—Improvements in looms for weaving.
1439. J. H. Penny and T. B. Rogers—Constructing machinery for propelling vessels, termed a "crank propeller." (A communication.)
1440. J. H. Johnson—Improvements in railway breaks. (A communication.)
1441. T. Richardson—Manufacture of certain salts of magnesia and a red colouring matter.
1442. J. L. Talabot and J. D. M. Stirling—Manufacture of iron.
1443. A. V. Newton—Mode of manufacturing cast steel. (A communication.)

Dated 15th June.

1444. G. Burstall—Bleaching oils and fats, and machinery for same.
1446. T. Butterworth—Machine for ploughing, harrowing, and clod-crushing at one operation.
1448. A. Robertson—Cases for storing and preserving edible substances.
1450. J. Macintosh—Portable boats or vessels and buoys.
1452. J. Dehan—Manufacture of woven fabrics, yarn, cordings, ropes, paper, and pasteboard, from a material not hitherto used in Great Britain for such purposes.
1454. J. J. Payne—Improvements in axles.
1456. J. Elliott and J. Brown—Machinery for making rivets, spikes, and screwblanks.

Dated 16th June.

1458. W. Baddeley—Improved label-damper.
1460. W. H. G. Field—Construction of barges and vessels, and means of steering.
1462. J. Blair—Improved mode of cutting lappet-cloths, and similar fabrics.
1466. R. A. Brooman—Machinery for sawing stone and marble. (A communication.)
1470. Dr. R. M. Glover—Production of chlorine, and manufacture of black oxide of manganese.
1472. J. Warren—Improvements in ploughs.

WEEKLY LIST OF PATENTS SEALED.

Sealed 24th June, 1853.

Year, 1852:

1158. William Ramsell, of Deptford—Improvements in boilers for generating steam and hot air together or separately.
1165. William Tuer, William Hodgson, and Robert Hall, of Bury, Lancashire—Improvements in the manufacture of textile fabrics, and in machinery or apparatus for weaving, part of which is also applicable to machinery for preparing textile materials.

Year, 1853:

147. William Williams, of Eccleshall—Improvements in refrigerating apparatus.
252. Edwin Pugh, of Whitstable, Kent—Improvements in the means of ballasting ships and vessels, and in rendering them buoyant under certain circumstances.
316. Richard Prosser, of 18, Broad-street, Birmingham—Improvements in the construction of printing-rollers used in machines for printing calicoes and other substances.
447. John Charles Pearce, of Bowling Iron Works, near Bradford, Yorkshire—Improvements in steam-boilers.
460. Samuel Cunliffe Lister, of Bradford, Yorkshire—Improvements in treating soap-suds.
721. William M'Naught, of Rochdale, Lancashire—Improvements in steam-engines.
858. Adolphe Marius Alexander Inglesia, of Russell-place, Fitzroy-square—Improvements in producing ornamental glass surfaces.
984. James Napier, of Partick, Lanarkshire—Improvements in separating certain metals from their ores and alloys, and for obtaining certain products therefrom.
1003. Uriah Scott, of 155, Grove-street, Camden Town—Improvements in the manufacture of tubular rods and rings for furniture.
1061. George Murton and William Hatton Langshawe, of Eagley Mills, near Bolton, Lancashire—Improvements in stretching, dressing, and finishing cotton and linen yarns or threads, and in the machinery or apparatus connected therewith.

Sealed 28th June, 1853.

Year, 1852:

1173. James Darling, of Manchester, and Henry Spencer, of Rochdale—Improvements in machinery or apparatus for preparing and spinning cotton and other fibrous substances.
1174. William Beckett Johnson, of Manchester—Improvements in steam-boilers and in apparatus connected therewith.
1175. Pierre Francois Giraud, of Paris—Invention of an apparatus for the interior of bonnets, to fix them on the head.
1177. Edward Mucklow, of Bury, Lancashire—Improvements in the construction of retorts for the manufacture of pyroligneous acid, or for other purposes of destructive distillation.
1178. Edward Mucklow, of Bury, Lancashire—Improvements in machinery or apparatus for cutting or rasping dyewoods.

Year, 1853:

7. Joseph Brough, of Longton—Invention of a new manufacture of a vitrified substance, and its application, alone or in combination with mineral, earthy, and plastic substances, to various useful purposes in the arts, and certain other new applications of known plastic substances.
10. David Hulett, of High Holborn—Improvements in the manufacture of ornaments for lamps, chandeliers, and architectural purposes.
16. Edward Clarence Shepard, of Duke-street, Westminster—Improvements in the manufacture of gas.
23. Gustave Paul de L'Huynes, of 21, Frith-street, Soho-square—Improvements in medical portative electro-galvanic apparatus.
26. Francis Edwards, of 26, Park-place, Toxteth-park, near Liverpool—Improvements in the method of lettering, figuring, and ornamenting the surface of enamel used for dials and other purposes.
42. William Sykes Ward, of Leeds—Invention of a thermostat, or apparatus for the regulation of temperature and of ventilation.
43. William Watson, of Leeds—Improvements in apparatus for the manufacturing of prussiate of potash.
55. John Abraham, of Birmingham—Invention of a new or improved method of manufacturing percussion-caps.
120. John Thornborrow Manifold and Charles Spencer Lowndes, of Liverpool—Improvements in steam-engines.
481. Antonio Fedele Cossuo, of University-street—Improvements in filters.
957. Sir William Snow Harris, of Plymouth—Improvements in lightning-conductors for ships and vessels.
1027. Alfred George Anderson and John Barker Anderson, of Great Suffolk-street, Southwark—Improvements in the treatment of certain saponaceous compounds obtained in the manufacture of soap.
1036. Thomas Revis, of Stockwell—Improved single seed drilling or dribbling machinery.
1048. John Kealy, of Oxford-street—Improvements in machinery for mowing.
1073. Robert Walter Swinburne, of South Shields—Improvements in the manufacture of glass.
1081. William Edward Newton, of 66, Chancery-lane—Improvements in hot-air furnaces for heating buildings, some of which improvements are applicable to other furnaces. (A communication)
1083. William Edward Newton, of 66, Chancery-lane—Improved machinery or apparatus for dressing millstones. (A communication.)
1084. George Bell, of Inchmichael, Perth—Invention of a new machine for several agricultural purposes.
1094. John Scott Russell, of Great George-street, Westminster—Improvements in marine steam engines.
1095. Charles Goodyear, of 25, Avenue-road, St. John's-wood—Improvements in combining india-rubber with certain metals.
1101. John Dempsey Holdforth, of Leeds—Improvements in machinery for combing or dressing silk and other fibrous substances.
1114. George Dowler, of Birmingham—Improvements in boxes for containing and igniting matches.
1115. Augustus Brackenbury, of Camden Town—Improvements in precipitating the muriate of soda from its solutions in water.
1125. James Nichol, of Edinburgh—Improvements in bookbinding.
1127. John Pullman, of 17, Greek-street, Soho—Improvements in the manufacture of losh, or oil-dressed leather.
1128 Henry Warner, Joseph Heywood, and William Cross, of Loughborough—Improvements in machinery used in the manufacture of framework knitting.
1146. Octavius Henry Smith, of Bedford-square, and Youngs Parfrey, of Pimlico—Improvements in the manufacture of carriage-wheels.
1148. George Tillett, of Kentish Town—Improvements in the manufacture of metal bedsteads.
1164. William Bradbury and Frederick Mullett Evans, of Whitefriars—Improvements in taking impressions, and producing printing surfaces. (A communication.)
1213. George Berry, of 19, Buttesland-street, St. Leonard's, Shoreditch—Invention of an improved method of roasting coffee, cocoa, and chicory.

WEEKLY LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

Date of Registration.	No. in the Register.	Title.	Proprietor's Name.	Address.
June 28	3479	Sun-dial Rule.	James Parkes and Son	Birmingham.